UNIVERSITY OF BIRMINGHAM | SCHOOL OF PHYSICS AND ASTRONOMY

Inclusive PWG Report (2025/10/07)

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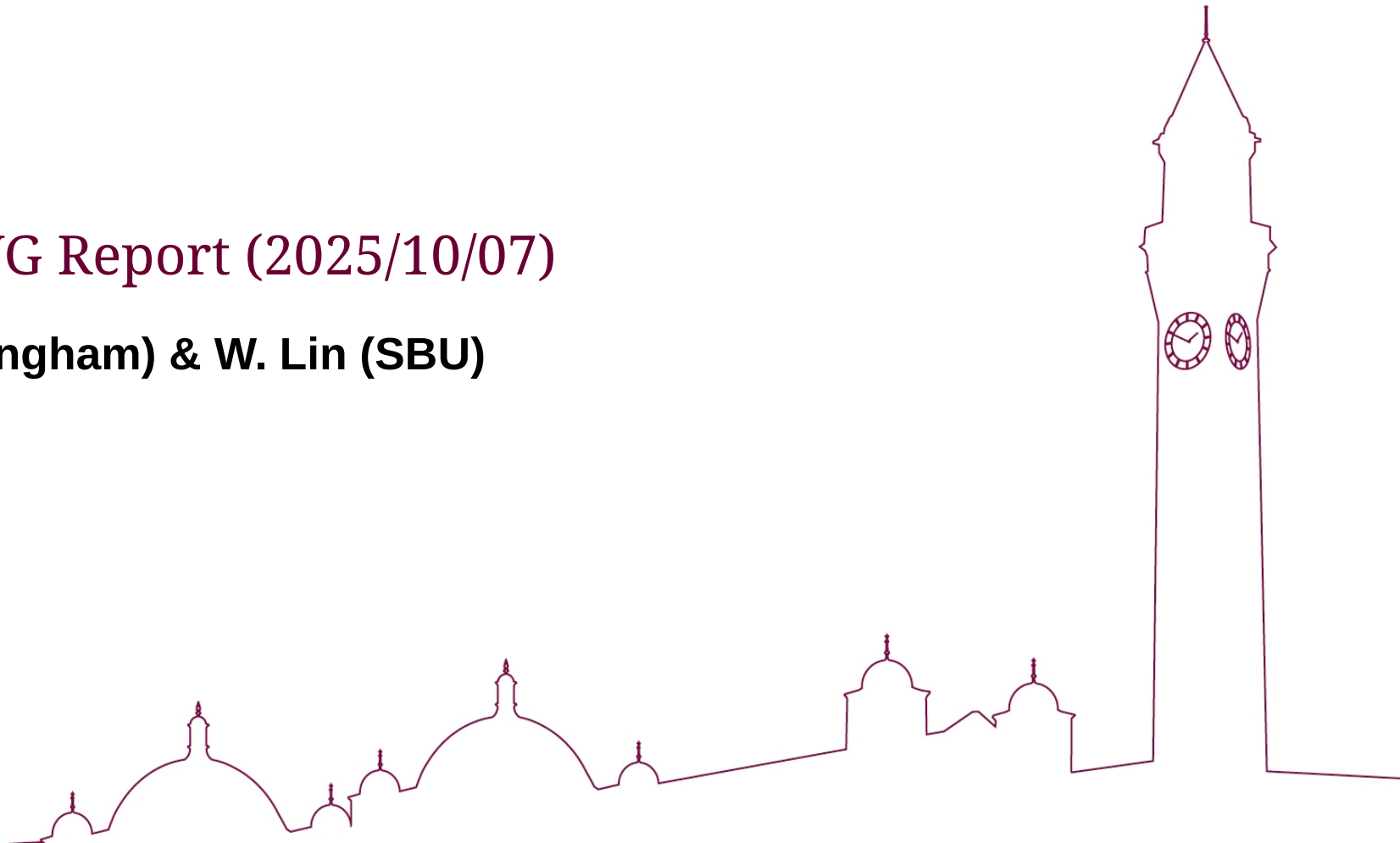


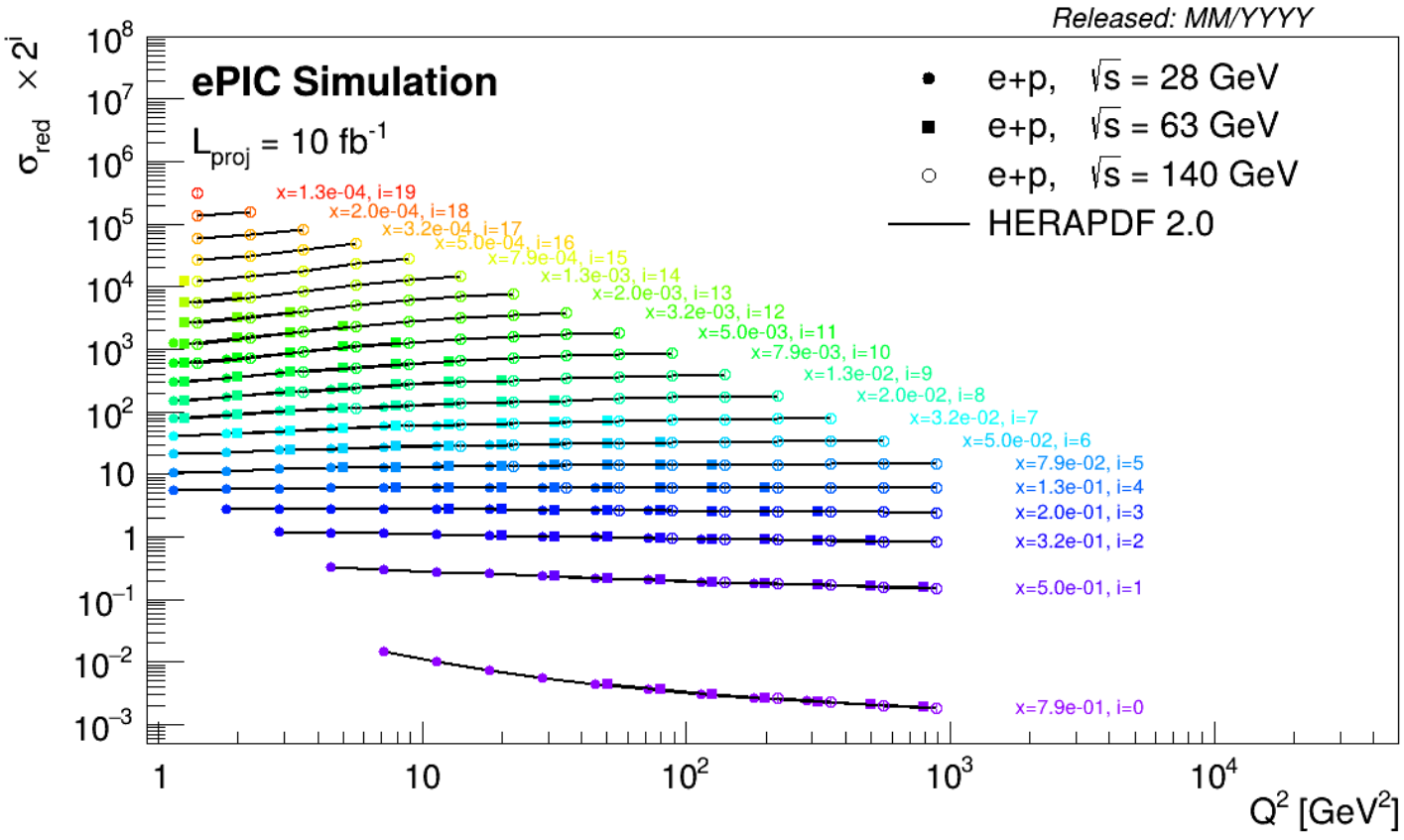
PreTDR Open Tasks Summary

- **Section 4.2.1 Electron Identification**
  - Need to add efficiency/purity benchmark to electron finder
  - Will tie in with background effects

- **Section 4.4.1 Inclusive Processes**
  - “Merge figs 4.5, 4.6, 4.7 into one plot showing all energy configs simultaneously (where there is an overlap of errors show that we can control systematics that way)”
    - Plotting done (using ePIC_Style.C) → need to update with 25.10 campaign files
  - “Add a bin migration plot”
    - Decided on purity plot → working modifying python plotting to be more similar to ePIC style
  - “Link and make clear systematics used in plots throughout the text”
  - “Fill section 4.4.1.3 (background effects)”
    - Will mostly consider this in context of electron finding → add minimum number of track measurements to electron finder and evaluate impact

Merged σ_{red} plot

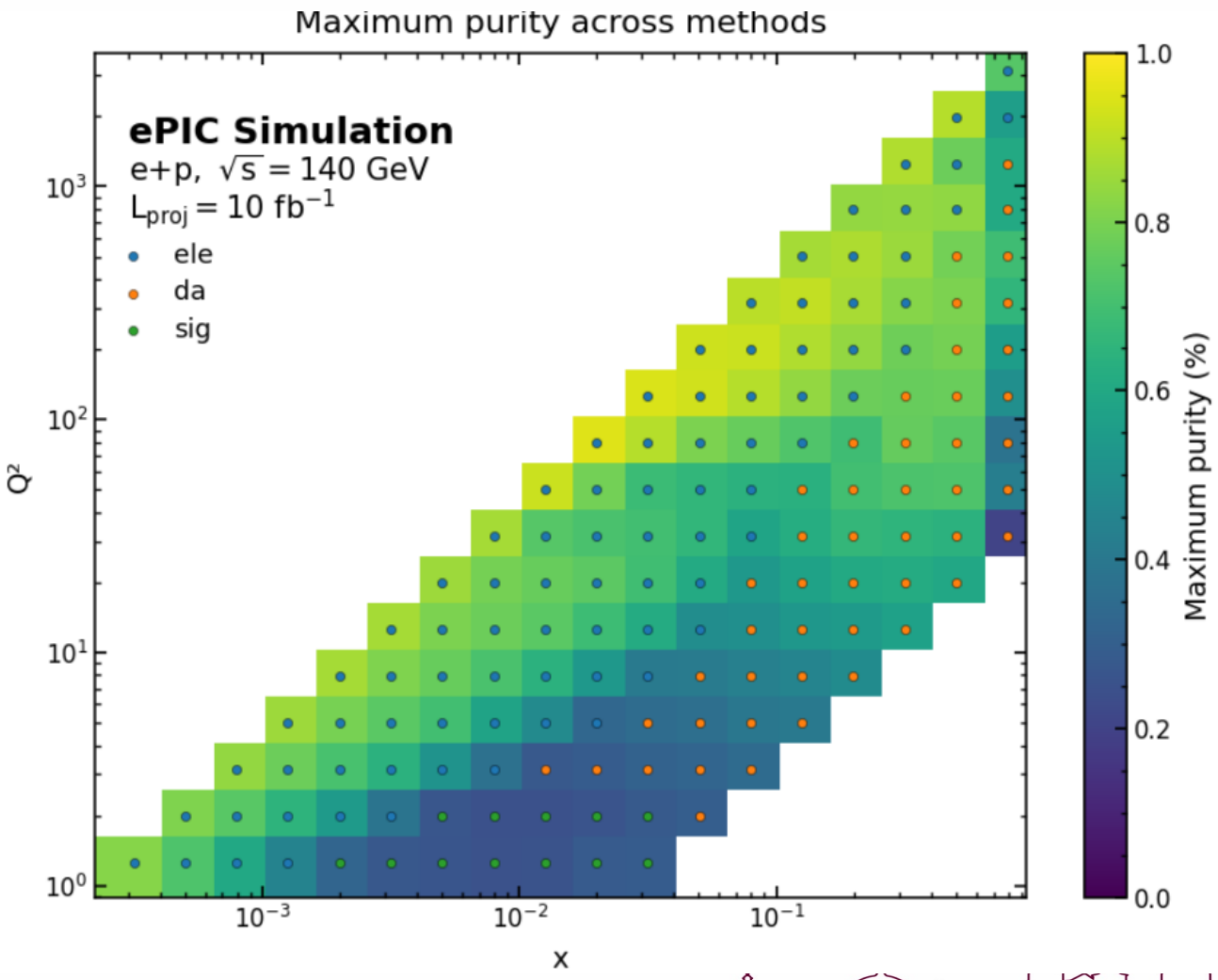
- Now using ePIC style
- “Released” tag to be removed / replaced with “Campaign 25.10.0”
- Do we want ePIC “Simulation”,”Preliminary” or ”Performance”?
- Note that “conservative” systematic uncertainties are included from this plo
  → Still not visible (even on linear scale)



Q2>1000 points to be added

Bin Migration Plot

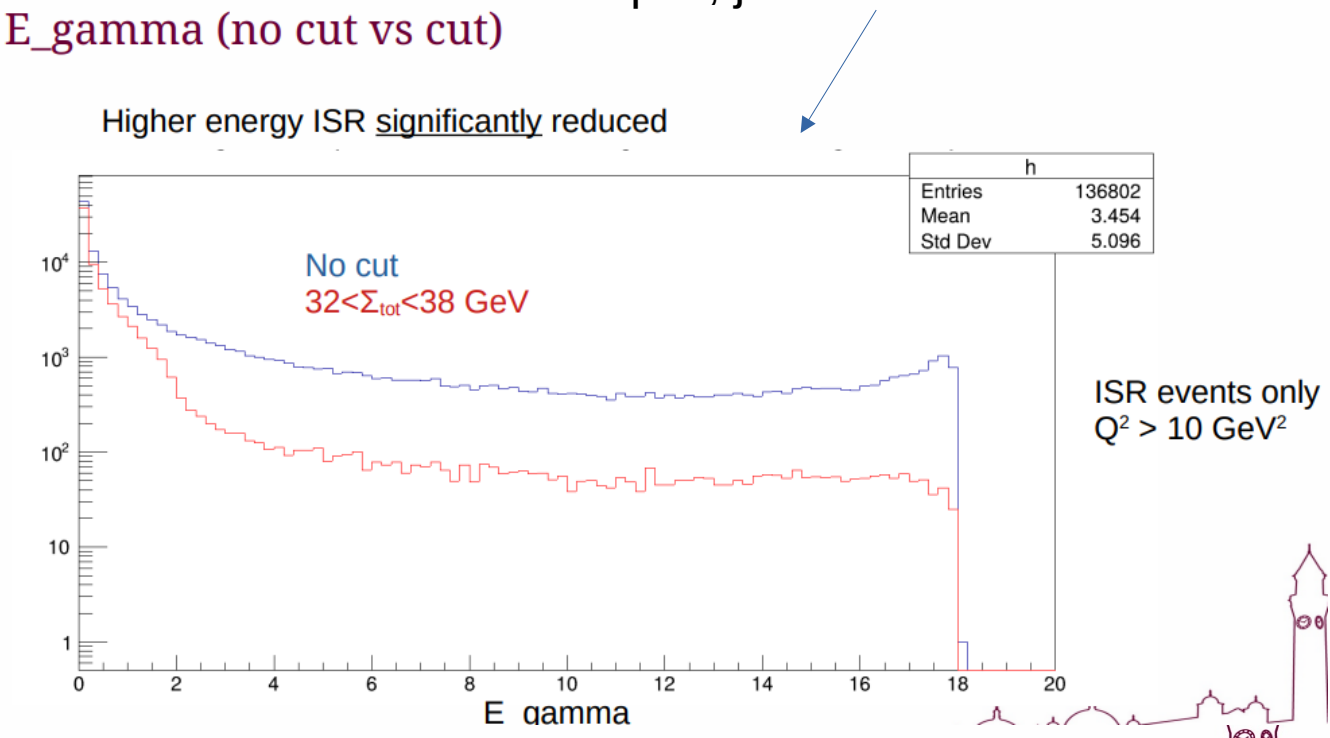
- Legend / Text on plot mostly sorted
- Some more tuning required to get axis labels consistent



Radiative Corrections

- Got Djangoh samples produced+simulated and done initial checks/debugging (see latest inclusive meeting)
- Aim to show size of radiative corrections w/ and w/o E-pz cut
  - Better E-pz resolution allows tighter cut and smaller corrections
- Should have plot ready for next week's inclusive meeting

Not intended as a preTDR plot, just for illustration



See https://indico.bnl.gov/event/30183/

Beam backgrounds

- Aim to evaluate electron finding and kinematic reconstruction with and without beam-induced backgrounds → finding efficiency, kinematic resolution, E-pz cut, minimum tracking hits requirement, pion contamination

Plans for background studies in coordination with Physics WGs

- So far – using the updated SR rates at 18x275 GeV – we have studied tracking performance when DIS events with $Q^2 > 1 GeV^2$ are overlayed with beam-induced backgrounds. For these studies, we used 2us time windows and forced a single DIS event to be present in each time window.
- We plan to extend these studies with two additional configurations:
  1. Each time window has a single photoproduction collision event with the beam backgrounds overlayed.
  2. Each time window has only beam backgrounds. No actual e-p collisions are present in this sample.
- We will study the tracking performance for these additional configurations.
- In addition, we will work with the Physics WGs – starting with the Inclusive WG – to extend the studies beyond track reconstruction performance.
- With the Inclusive WG, we will focus the attention on the electron finder and kinematic reconstruction performance.
  - For example, the Inclusive WG will work to update the electron finder to have more flexibility to include things like minimum number of measurements (e.g., 4) for the reconstructed track. This updated electron finder can then be tested on the background samples mentioned above.